

Benign paroxysmal positional vertigo

- Anatomy:

- -Vestibular system is formed of 3 SCC, utricle & saccule.
- -Hair cells are the <u>Sensory Cells</u>, which are sensitive to fluid movement that is caused by:

 - *linear acceleration (gravity) utricle & saccule (otoliths organs) in which hair cells are imbedded in macula & covered by crystal-laden membrane called otolithic membrane.

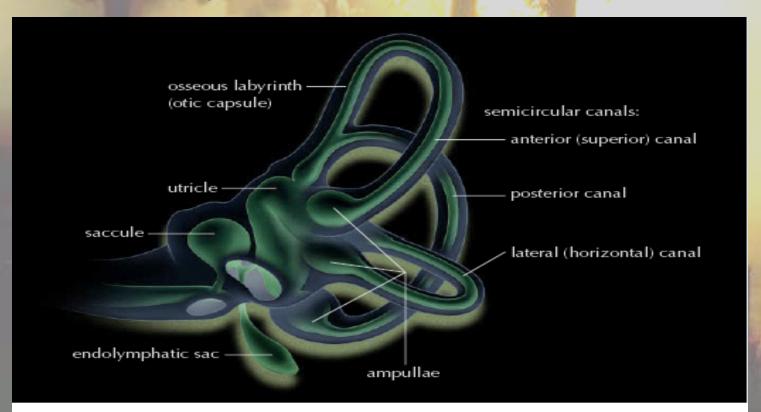
BPPV

-Definition:

- -Sudden rotatory vertigo induced by head movement, usually start 1-40 sec. after the patient has been placed in provoking position.
- nystagmus appear with the same latency as vertigo, they usually disappear within 60 sec.(but they may persist as long as the patient persist in provoking position).
- BPPV is the cause of about 17% of cases of vertigo.

- Incidence:

- Posterior SCC is affected in more than 90% of cases of BPPV due to its gravity dependent position.
- Horizontal SCC is about 6 8 %.
- Superior SCC is rarely affected < 1% due to its superior position.</p>

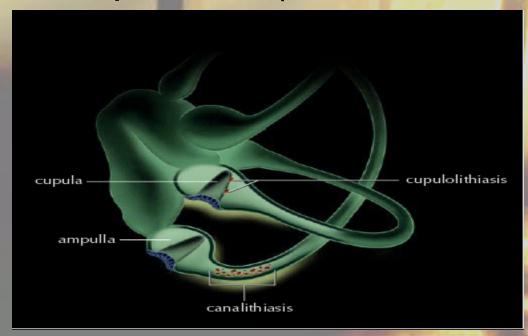


Precipitating factors :

- 1-spontaneous in many patients.
- 2- may follow: -head trauma.
 - -labyrinthitis.
 - -ischaemia in anterior vestibular artery
 - distribution.
- 3-common in older people.

The commonest causes of BPPV are:

- 1- Canalithiasis (free floating otoliths / debris within endolymph).
- 2- Cupulolithiasis (otoliths / debris attached to cupula of SCC).





Mechanism

1- Canalithiasis:

- the commonest
- otoconia of utricle float freely in endolymph of the canal, which in turn pulls on cupula & firing rate of neurons.
- -vertigo & nystagmus usually last less than 60 sec.

2- Cupulolithiasis:

- less common
- cupula become gravity sensitive due to adhesion of these degenerative debris, ↑ density of cupula → inappropriate deflection of hair cells, causing vertigo & nystagmus.
- -they persist as long as patient is in the provoking position (slight \in intensity)



1- History:

• History of <u>attacks of vertigo</u>, precipitated by certain head position, persist from 30 sec to several minutes (as patient may consider both vertigo & disequilibrium that may follow it).

- <u>other complaints</u>: light headedness, nausea, vomiting, imbalance,
- good history is important to identify the possible causes of secondary BPPV as: head trauma, viral labyrinthitis, vestibular neuritis, Meniere's disease, migraine...

2- Diagnostic Maneuvers:

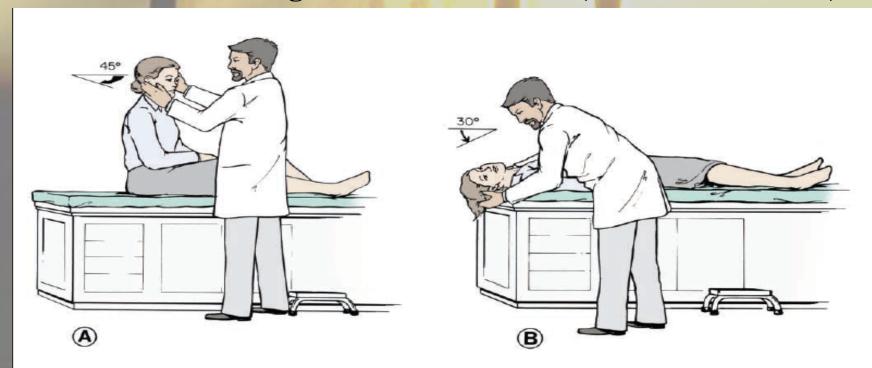
a- Dix-Hallpike test:

- most commonly used to confirm diagnosis of BPPV.
- -Based on the following criteria:

-latency -duration

-direction -fatigability

-vertigo -reversal (when sit after test)



1- Posterior canal BPPV:

- latency : 3-5 sec.
- duration: 1 min (usually 5-15 sec.)
- repetition —— will fatigue the response
- Nystagmus is geotropic rotary (upward + torsional), observed by: simple vision, Frenzle goggles....

2-Horizontal canal BPPV:

- · less common.
- shorter latency (0-3 sec), longer duration (15-60 sec), than posterior canal BPPV.
- · horizontal nystagmus, which may be:
 - -Geotropic type in canalithiasis.
 - or -ageotropic type --- in cupulolithiasis.

3- Superior canal BPPV:

- rare (<1%).
- nystagmus is torsional & directed downward.
- longer duration of nystagmus.

4- Mixed canal BPPV:

- more than one scc is involved.
- the most common is the involvement of both "Posterior & Horizontal SCC".

b- Side lying Test:

• Uses: for patients who aren't able to perform Dix-Hall pike maneuver.

Technique:

- -patient sits on the bed with legs over the side.
- -head is rotated 45 degrees horizontally <u>away from labyrinth</u> to be tested.
 - -then, lie down quickly on the side opposite to turned head direction, any vertigo or nystagmus should be reported.
 - -then, sit with head still 45 degrees, recheck for nystagmus or vertigo.
 - -then, head is rotated 45 degrees horizontally to the opposite direction, & repeat the test on the opposite side.
 - -then, he sits up...
 - -asking about vertigo & nystagmus observation should be done in each of these stages...
- But, it's useful only for posterior canal...

• Differential diagnosis:

1-Meniere's disease:

- -vertigo: not provoked by position change last much longer(> 30 min to several hours)
- there is tinnitus & hearing loss.

2-Vestibular neuritis:

- vertigo usually persist for days & aggravated by head movement in any direction so careful history should be taken to avoid confusion with position change-evoked vertigo...
- 3-Rarely, posterior fossa tumor, other inner ear or CNS disorders...



1-Exercise maneuvers.

2-Non-Exercise ttt.:

a- medications.

b- surgical procedures.

- Exercise treatment :
 - -Successful treatment depend on:
 - *which canal is involved?
 - *debris is floating or adherent to cupula?

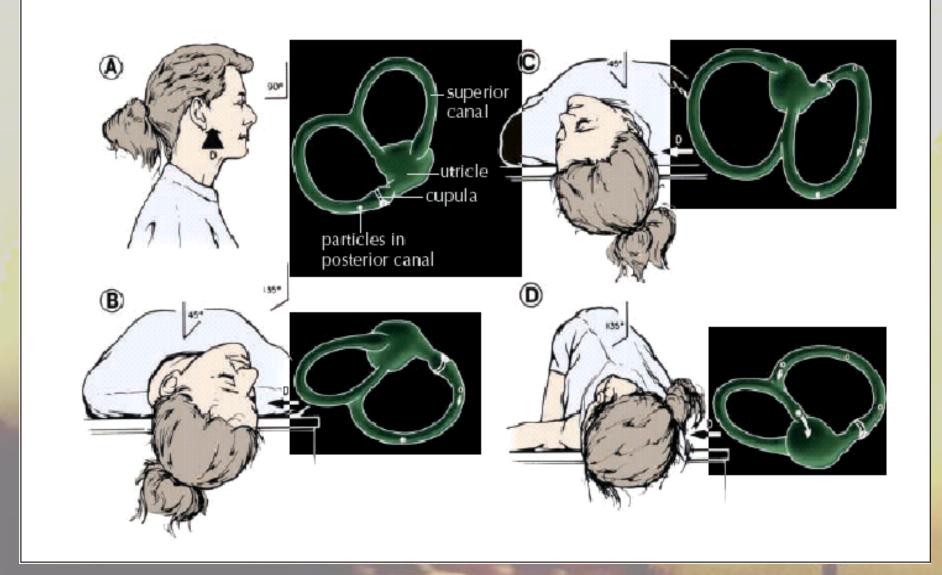
- 3 Basic bed side treatments for BPPV:
 - •Canalith repositioning treatment (CRT). (Epley method)
 - Liberatory maneuver of **Semont**.
 - Brandt- Daroff habituation exercise.

1-Canalith repositioning treatment (CRT):

- **Principle:** -series of head positions allow for debris movement.
 - -it's effective for posterior & anterior canalithiasis.
 - -nystagmus should be in the same direction throughout the ttt., meaning that debris move through the canal into common crus.

►Technique:

- first, patient move into Dix-Hallpike position to the <u>affected ear side</u> & stay for 1-2 min.
- -then, head is slowly rotated with moderate extension toward the unaffected side(90 degrees) & stay in that position briefly.
- -roll the patient another 90 degrees until head is diagonally opposite the first position (for 30-60 s).



-short spells of vertigo & nystagmus of the same characters as the original nystagmus indicate that debris move away from cupula into common crus .

Post ttt instructions:

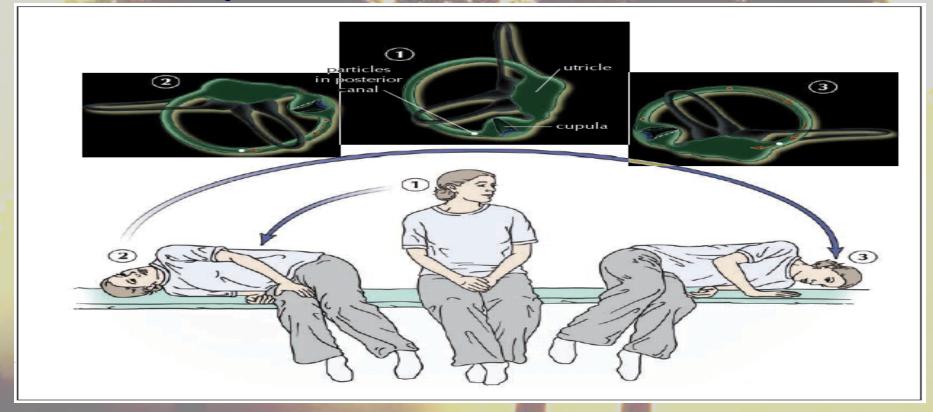
1-after ttt, patient should fit with soft collar & told NOT to bend over, lie back, move head up or down or to either side for the rest of day.

- 2-keep head upright even while sleeping for 48 h.
- 3-NOT to sleep on affected ear 5 days later.

Complications:

- 1- otoconia move into another canal.
- 2- neck stiffness & muscle spasm due to head upright position.
- 3-severe nausea & vertigo during ttt.

2- Liberatory maneuver:

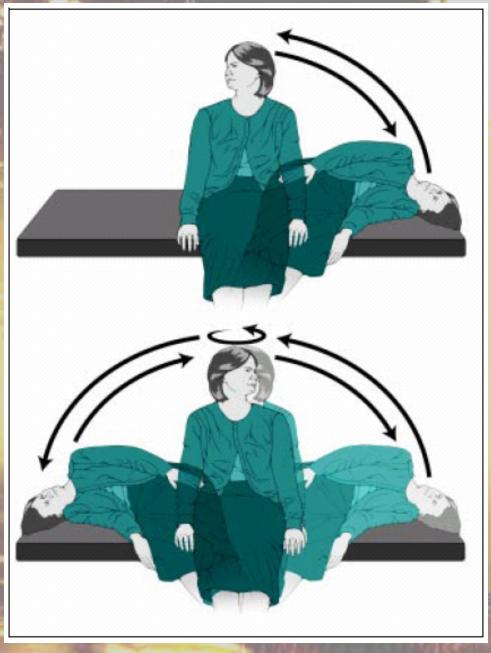


- •Used in cupulolithiasis.
- •Series of rapid changes of head position freed deposits that were attached to cupula.
- •Begin with patient in sitting position & head turned <u>away from affected side</u>, then quickly lie on his side, toward the affected side with head up. After 5 min, move back through sitting position, to opposite position with his face downward, for 5 min. & then return slowly to sitting position.

3- Brandt – Daroff maneuver:

Technique:

- -begin with sitting upright on the edge of bed, with head turned 45 degree to one side.
- -Then, move rapidly down into side-lying position, with head in the same direction & stay for 30 s.
- -Then return to upright position & hold this for 30 s.
- -The head is turned to the opposite direction & the same procedure is repeated on the other direction
- -Patient repeat whole sequence till no vertigo occur with position change.



• Non – exercise treatment :

1- <u>Medications</u> have <u>no</u> rule in ttt of BPPV, but they may be used to relieve the associated nausea e.g.:-promethazine.

2- Surgical ttt: e.g.:

- -vestibular nerve section.
- -singular nerve section (which innervate the posterior canal).
- -occlusion of affected canal.

• Surgery is rarely used because of successful management using exercise...

• Treatment of Horizontal canal BPPV:

A-Barrel roll maneuver:

- rolling the patient 360 degrees from supine to supine position, keeping the canal perpendicular to ground the patient is rolled away from the affected ear in 90 degrees increments until a full roll is completed...
- this move the particles out of canal into utricle.

B- Log roll maneuver:

- -begin with patient's head turned completely <u>toward the</u> <u>affected ear</u>.
- -the patient then rapidly turned <u>away from the affected ear</u> in 90 degrees increments for a total of 270 degrees, with head being held in each position for about 1 min. ...

